A VIRAL WARNING FOR CHANGE
The Wuhan coronavirus versus the Red Cross: better solutions via blockchain and artificial intelligence

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"One of the lessons learned was that emergency response must be better developed at the local level."[i] This is what the Red Cross said on the 10 year anniversary of the deadly Wenchuan earthquake in Sichuan province in western China. Billions of dollars had been donated following the Sichuan earthquake but had been "mishandled".[ii]

This article addresses what should be a simple question: how can we do better? Doing better facilitating the delivery of supplies to people in need. Doing better to stimulate confidence in the organizations charged with managing humanitarian crises.

The present crisis is a call to arms for China's tech industry, which has the know-how and resources to radically change the landscape of crisis response and the management of donations through the implementation and use of blockchain and artificial intelligence (AI).

Together with global technologists, fundamental changes are needed to the structure and method of how such crises are handled. The time to develop, on a collaborative basis, borderless solutions to issues of common humanitarian concern is now.

Evidence from the current crisis

The coronavirus originating in Wuhan has created specific issues. Protective equipment and millions of dollars are being donated by the public. However, there is widespread concern that donations are not being put to use where needed and there is evidence of the supplies being misdirected – according to the Hubei Red Cross it's a misunderstanding based on a spelling mistake.[iii] This impacts on the willingness of the public to donate and thus retards the objective of addressing a problem.

Incidents such as these are not new, nor uniquely Chinese. In 2018 donations for survivors of Hurricane Maria (Puerto Rico, 2017) were found rotting in a car park.[iv] From penicillin being stolen and faked in World War II through to today, fake medicine is a problem in many parts of the world and, sadly, throughout human history.[v] However, what is uniquely Chinese in the present context is that Beijing has ordered all public donations to be funnelled to five government-back charity organisations.[vi] This is a throwback to pre-2016 China, before the Charity Law of China was introduced to enable the establishment of private charities.[vii]

The Charity Law was intended to develop the charity field and protect the interests of relevant stakeholders. Although all charities in China are required to have in place sound internal governance structures, without which they will be unable to engage in fundraising,[viii] the funnelling order implicitly assumes that the five government-backed charities are fit for purpose and better able to manage the current crisis. That assumption

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may be at odds with historical and more recent evidence suggesting organizations responsible for responding to crises appear to struggle to manage their core responsibilities. And if Beijing's implicit assumption is wrong then the centralizing effect produced by funnelling merely serves to compound the problem.

There is a better way

When crises occur they are by their nature large scale, happen quickly and unexpectedly, and become increasingly tragic the longer it takes for an effective response to emerge. The striking concern about the present situation in the Hubei Red Cross is the degree of opacity involved given that the charities receiving donations have a fiduciary and moral duty to apply donations effectively and for the purposes intended. News reports, being the only supply of information available, suggest that is not happening.

Blockchain

In mid-2018 over half a million substandard vaccines for babies found their way into hospitals across China,[ix] a problem that recurred less than 6 months later with expired polio vaccines.[x] At the time it was argued that the production and distribution of vaccines is a public concern that could be managed with a distributed ledger blockchain solution.[xi] The management and application of public donations is no less the case. So how can blockchain help?

Blockchain is relevant because it is a superior tool for tracking and verifying the origin, journey and use-destination of pretty much anything. It can be applied to donation dollars, or N95 masks. Here's how it works. Blockchain is essentially a computer program that is based on computational laws and cryptography to make a digitally secure record – usually referred to as being "immutable" because it is unable to be subsequently changed. Copies of the program and the records it stores are typically distributed across a number of computer servers, thus creating a distributed ledger. The ability to add to the chain of records is determined either by some form of public consensus mechanism (for example, the Bitcoin network operates like this over thousands of computer servers), or on a permissioned basis. The latter is called a private network and write-access to the network is only provided to designated trusted persons. A private network thus creates clear points at which it is possible to hold a person or organization to account.

A private blockchain network would enable the recording and tracking of anything that is donated. Logistically, there needs to be points of entry to the system, for example, when a box of masks is placed on a plane, when it arrives at the receiving warehouse, and when it is delivered to a hospital. At each point a trusted person is able to write to the blockchain, possibly also posting to it evidence such as a bill of lading or a signature of receipt. The same can be applied to funds that are donated, particularly as most funds are now typically donated through e-payment channels which could be digitally connected into the blockchain writing process.

Importantly, while writing to the private blockchain is strictly controlled, it can also be given public visibility, providing transparency to all stakeholders – donors and donees, as well as public oversight bodies. Anyone could track the progress and use of their donation. Many readers will have already been exposed to a similar system without realising it: purchases made over the internet are frequently accompanied by a link and a tracking code that allows a purchaser to follow each step of the delivery progress.

This technology is already in widespread usage, such as by the likes of SF Express and Apple - why not charities?

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Artificial intelligence

The other significant problem that charities face when responding to crisis is a logistical one. Let us take the apparent shortage of masks and other protective gear for medical workers in Wuhan. If a charity had, say, 50,000 units of protective equipment it can only spend them once. Yet the virus is spreading and there are difficult decisions that need to be made to determine the optimal time and place to spend a limited supply. In what areas can the masks have the greatest preventative effect? Is it where the virus has made its mark, or where it is starting to spread? These are complex, data-dependent questions made more difficult where resources are limited. Into the equation must be added the call to mask producers to increase their production. How long will it take to manufacture and deliver another 50,000 units of protective equipment? If there is a certainty of supply tomorrow instead of a week from now, this will affect the decision how to spend the masks today. Protective body suits are also in short supply but likely take longer to make than masks. How effective will masks be if delivered to medical workers in highly infected areas who do not have body suits?

The foregoing obviously requires expert judgements and the integration of considerable amounts of data that is, so far as infection data is concerned, not only subject to rapid change but is inevitably out of date. This is the context where AI can be employed to assist humans to determine optimal outcomes. In a blockchain based donations context, such outcomes would not only be based on models developed by epidemiologists but also by the current and forecast supply and utilization of limited resources. Importantly, there would be visibility of the process, which is critical to restore public trust in the system and the ongoing flow of much needed donations.

Again, AI is already embedded in a wide range of industries - why not charities?

A call to arms

The current crisis has yet to run its course, yet we already anticipate the next crisis. How can technological changes be implemented? What are the short, medium and long term solutions?

Over the medium to longer term, the solution in China may rest on the progress of a principle established by the Chinese government in 2013 that the market should be allowed to play a decisive role in the allocation of resources.[xii] In November 2018, President Xi Jinping emphasised the need for private enterprise to participate in the reform of state-owned enterprises.[xiii] A series of policy documents ensued that culminated in a mixed ownership reform pilot program for 2018 to 2020.[xiv] While these reforms have focussed on industry, the underlying reality is that centrally controlled organisations, be it a state owned enterprise or a government-backed charity, have not developed management systems or innovated solutions to problems at anything like the pace that private enterprise has.

Recurring crises in China may present a starting point for technological solutions based around some form of public-private partnership. Since 2018 VeChain and DNV GL have been exploring blockchain technology to create drug traceability. In November 2019 Xinhua news reported that the National Medical Products Administration will launch a nationwide vaccine tracking system in March 2020 that covers the entire supply chain.[xv]

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This kind of development reflects the comments of President Xi Jinping made in October 2019 to the effect that China must seize the opportunity presented by blockchain technology. In particular, it is an excellent use case example of what President Xi termed "Blockchain+", referring to blockchains that support basic needs such as, among other things, medicinal safety.[xvi]

In the shorter term, the current crisis should serve as a call to arms for China's tech industry to get engaged in finding a solution. To this effort should be added Hong Kong's excellence in epidemiology, financial provenance and dealing with medical and public data sets.[xvii] And there is no reason that the call to arms should not also extend to tech firms globally to collaborate at several levels. While AI is one area where the desirability of a cooperative landscape is becoming increasingly apparent,[xviii] there is a need to establish common standards for dealing with common problems. For example, understanding the process by which quality data can be acquired, verified, managed and shared.

If China can build a hospital in under two weeks, can the combined efforts of tech giants develop a blockchain and AI system in short time? The likes of Alibaba, Tencent, Ping An and SF Express possess technology, know-how and experience that would take years for a charity to invent from scratch. While companies such as Cainiao, SF Express and Jiuzhou Tong are already involved in helping solve the current donations crisis in Wuhan,[xix] they are stopgap solutions and an enduring solution is still needed that fundamentally changes the structure and method of how such crises should be handled.

But it must not stop there. Future crises will emerge. Let us not wait and find ourselves talking sentimentally about "lessons that were learned". We need to learn now, learn fast, and engage technology to make the difference.

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[i] 12 May 2018, per the International Federation of Red Cross and Red Crescent Societies (IFRC). See https://media.ifrc.org/ifrc/opinion/sichuan-earthquake-lessons-learned-owe-loved-ones-lost-2/

[ii] https://www.inkstonenews.com/china/embezzled-funds-and-charities-crisis-hit-reputation-sichuan-quake-relief/article/2145738

[iii] Claiming that a donation of KN95 masks had been wrongly recorded as N95 masks. http://www.hbsredcross.org.cn/xxgk/8667.jhtml

[iv] https://www.nytimes.com/2018/08/10/us/puerto-rico-aid.html

[v] Paul N Newton and Brigitte Timmermann, "The Third Man, and Operation Claptrap", BMJ 2016; 355. See also http://www.wwarn.org/aqsurveyor/#0

[vi] https://www.scmp.com/news/china/society/article/3048512/china-red-cross-under-fire-poor-delivery-coronavirus-supplies

[vii] Charity Law of the People's Republic of China. See (English translation) https://www.chinalawtranslate.com/2016-charity-law/ , (Original chinese) http://www.npc.gov.cn/npc/dbdhhy/12_4/2016-03/21/content_1985714.htm

[viii] Articles 12 and 22 of the Charity Law of China.

[ix] https://www.scmp.com/news/china/policies-politics/article/2159892/chinas-vaccine-scandal-firm-made-500000-substandard

[x] https://www.inkstonenews.com/society/vaccine-scandal-rocks-jiangsu-china/article/3000457

[xi] https://mp.weixin.qq.com/s/8TZ1Bcq86-fjK2F-qRn9ww

[xii] Third plenum of the Central People's Government of the People's Republic of China, November 2013. This was quickly followed in May 2014 by the *Notice to Encourage Private Capital to Invest in First Infrastructure Projects*

[xiii] http://www.xinhuanet.com/english/2018-11/02/c_137575231.htm

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[xiv] Reemphasized in 2019 by SASAC and the National Development and Reform Commission.

[xv] http://www.xinhuanet.com/english/2019-11/14/c_138555121.htm

[xvi] Remarks made at the the 18th collective study of the Political Bureau of the Central Committee. https://www.coindesk.com/president-xi-says-china-should-seize-opportunity-to-adopt-blockchain

[xvii] data.gov.hk

[xviii] E.g, see https://foresight.org/wp-content/uploads/2019/12/2019-AGI-Cooperation-Report.pdf

[xix] Cainiao, a logistics company in Alibaba Group, coordinated with other Chinese domestic logistics companies to deliver medical consumables directly to the Wuhan Union Hospital (https://news.mydrivers.com/1/669/669635.htm), SF Express has provided transportation support for medical and epidemic prevention materials donated to Wuhan (https://www.sf-express.com/cn/en/notice/detail/Notice-on-the-delivery-of-relief-materials-for-Hubei/) and Jiuzhou Tong has been assisting the Red Cross to more efficiently receive and distribute donations. See also https://news.sina.cn/2020-02-02/detail-iimxxste8253437.d.html?from=wap

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